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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,412

09/01/2006

Kurt Holm

7396.3009.001

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7590

05/01/2008

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EXAMINER

THOMAS, COURTNEY D

ART UNIT

PAPER NUMBER

2882

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,412	<b>Applicant(s)</b> HOLM ET AL.	
	<b>Examiner</b> Courtney Thomas	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/01/06</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

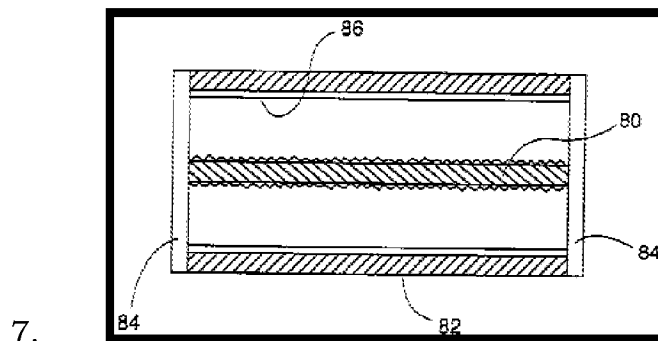
1. Claim 1 is objected to because of the following informalities:
2. Claim 1, lines 4-6 recite: "... the cathode comprising a thin layer of an electron emitting material and the cathode comprising ..." Examiner suggest the phrase be re-written as: "... the cathode comprising a thin layer of an electron emitting material and ..."
3. The claims have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the claims.
4. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ribbing et al. (U.S. Patent 6,477,233) in view of Dunham et al. (U.S. Patent 6,385,292).



**Fig. 8 - X-ray source (embodiment) - U.S. Patent 6,477,233 to Ribbing et al.**

8. **As per claims 1, 7 and 13**, Ribbing et al. disclose an X-ray tube (and corresponding method) comprising an anode (**86**) and a cathode (**80**), the cathode comprising a thin layer of an electron emitting material (5:35-40); the cathode having a substrate substantially transparent to X-ray radiation (col. 7:66 - col. 8:6) and the X-ray tube designed as an anode hollow cylinder with a coaxial cathode cylinder (rod) inside (see Fig. 8 shown above). Ribbing et al. do not explicitly disclose the cathode is designed as a hollow cylinder.

9.

Cathode 92 may have a tungsten coil 100. However, cathode 92 may be also be formed of a cone-shaped field emitter, a hollow cylinder emitter, a carbon nanotube emitter, a photo emitter or other type of emitter known to those in the art. The

**Col. 6:64-67 - U.S. Patent 6,385,292 to Dunham et al.**

10. Dunham et al. disclose an X-ray tube comprising cathode (92 - see Fig. 6, not shown above). Dunham et al. teach that a cathode constructed as a hollow cylinder emitter is a known structural emitter variant (col 6:64-67).

11. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the X-ray tube (and method) of Ribbing et al. such that it incorporated a hollow cylinder cathode. One would have been motivated to make such a modification for the purpose of fabricating an emitter

for specific emission characteristics as taught by Ribbing et al. (col.5:40-45) and further supported by Dunham et al. (col 6:64-67).

12. **As per claims 2, 8 and 14**, Ribbing et al. as modified above, disclose an X-ray tube (and corresponding method) wherein the cathode closes a vacuumized internal chamber from the outside (see Fig. 8, shown above).

13. **As per claim 3 and 9**, Ribbing et al. as modified above disclose an X-ray tube (and corresponding method) wherein the anode comprises at least one of gold, molybdenum, tungsten or a compound of metals (Ribbing et al. col. 5:50-52).

14. **As per claims 4-6 and 10-12**, Ribbing et al. as modified above, disclose an X-ray tube (and corresponding method) wherein the cathode comprises a thermionic emitter, and/or cold emitter; the cold emitter comprising metal or graphite tips and/or carbon nano-tubes.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (571) 272-2496. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272 2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Courtney Thomas/

Courtney Thomas  
Primary Examiner  
Art Unit 2882